

AD-A031 276

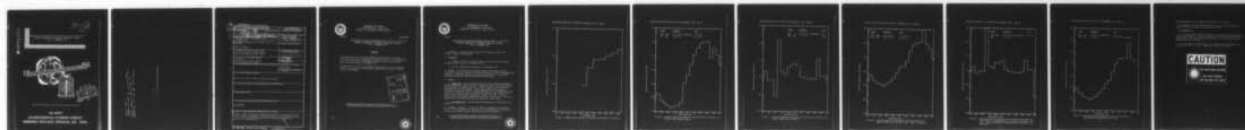
ARMY ENVIRONMENTAL HYGIENE AGENCY ABERDEEN PROVING GR--ETC F/G 6/18  
SPECTRAL IRRADIANCE OF SEVERAL ULTRAVIOLET SOURCES, JULY - SEPT--ETC(U)  
OCT 76 J K FRANKS

UNCLASSIFIED

USAEHA-42-0305-77

NL

1 OF 1  
AD  
A031276

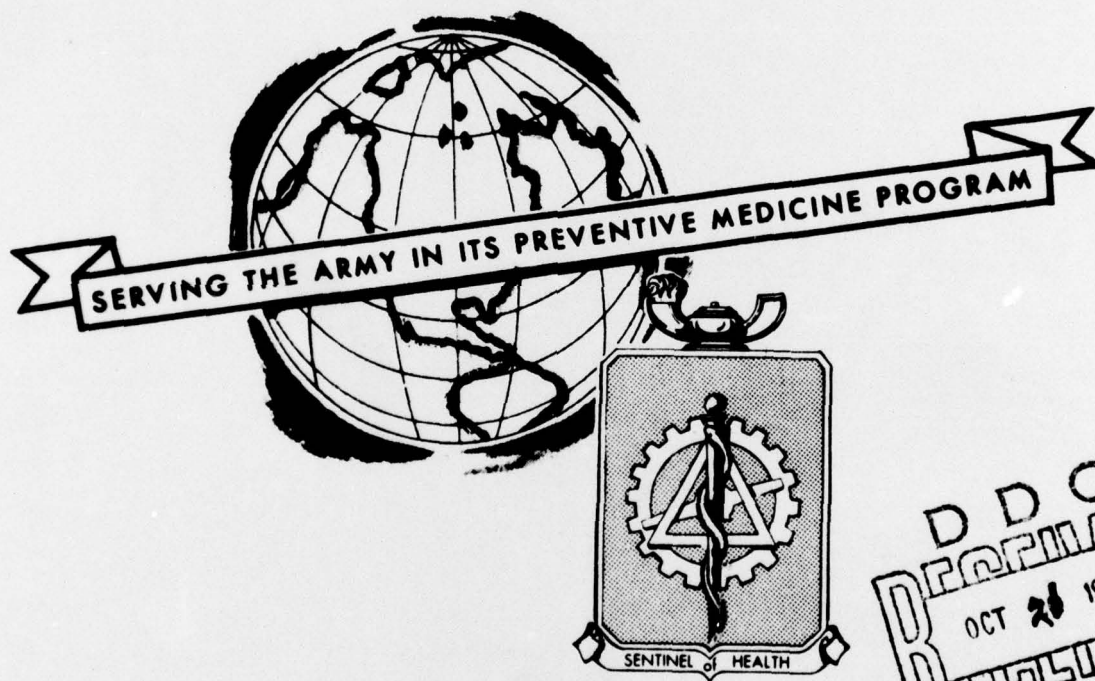


END

DATE  
FILMED  
11-1-76

AD A031276

NONIONIZING RADIATION PROTECTION SPECIAL STUDY NO. 42-0305-77  
SPECTRAL IRRADIANCE OF SEVERAL ULTRAVIOLET SOURCES  
JULY - SEPTEMBER 1976



Approved for public release; distribution unlimited

US ARMY  
ENVIRONMENTAL HYGIENE AGENCY  
ABERDEEN PROVING GROUND, MD 21010

Reserve notes:  
Statement put on virtually when  
Rights notice on documents. No  
restriction on use per Mrs. Donovan.

14  
USA EHA -

UNCLASSIFIED  
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 42-0305-77	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) NONIONIZING RADIATION PROTECTION SPECIAL STUDY NO. 42-205-77 SPECTRAL IRRADIANCE OF SEVERAL ULTRAVIOLET SOURCES, JULY - SEPTEMBER 1976		5. TYPE OF REPORT & PERIOD COVERED Special Study July - September 1976
7. AUTHOR(s) James K. Franks		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Environmental Hygiene Agency Aberdeen Proving Ground, MD 21010		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Commander US Army Health Services Command Fort Sam Houston, TX 78234		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 11, 13 Oct 76
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT NUMBER 12, 12 P.
		13. NUMBER OF PAGES 10
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Phototherapy Ultraviolet		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  A special study of the optical hazards associated with the operation of five different types of laboratory ultraviolet sources in the Toxicology Division of the US Army Environmental Hygiene Agency was performed during the period July - September 1976.		

038 150

CA



HSE-RL

DEPARTMENT OF THE ARMY  
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY  
ABERDEEN PROVING GROUND, MARYLAND 21010

13 OCT 1976

NONIONIZING RADIATION PROTECTION SPECIAL STUDY NO. 42-0305-77  
SPECTRAL IRRADIANCE OF SEVERAL ULTRAVIOLET SOURCES  
JULY - SEPTEMBER 1976

ABSTRACT

A special study of the optical hazards associated with the operation of five different types of laboratory ultraviolet sources in the Toxicology Division of the US Army Environmental Hygiene Agency was performed during the period July - September 1976.

Recommendations include a requirement for operators to wear protective eyewear when exposed to the shortwave lamps and the placing of labels on all of the lamps.

ACCESSION FOR	
NTIS	Write Section <input checked="" type="checkbox"/>
DIC	Dist Section <input type="checkbox"/>
UNANNOUNCED	
JUSTIFICATION	
BY	
DISTRIBUTION/AVAILABILITY CODES	
Dist.	ACAIL. end. or SPECIAL
A	

Approved for public release; distribution unlimited





DEPARTMENT OF THE ARMY  
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY  
ABERDEEN PROVING GROUND, MARYLAND 21010

HSE-RL

NONIONIZING RADIATION PROTECTION SPECIAL STUDY NO. 42-0305-77  
SPECTRAL IRRADIANCE OF SEVERAL ULTRAVIOLET SOURCES  
JULY - SEPTEMBER 1976

1. **AUTHORITY.** Disposition Form, HSE-LT, this Agency, 5 May 1976, subject: Request for Analysis.
2. **REFERENCES.**
  - a. AR 40-46, Control of Health Hazards from Lasers and Other High Intensity Optical Sources, 6 February 1974.
  - b. AR 40-5, Health and Environment, 25 September 1974.
3. **PURPOSE.** To evaluate the potential hazards associated with the ultraviolet radiation emitted by several sources and to make recommendations designed to eliminate exposure of unprotected personnel to potentially hazardous ultraviolet radiation emitted by these lamps.
4. **GENERAL.**
  - a. Background. The Toxicology Division of the US Army Environmental Hygiene Agency uses several types of ultraviolet lamps for various studies on photochemically induced toxicity. Similar lamps are used throughout Army hospitals in phototherapy. These lamps produce most of their radiation in the UV-A (315 nm - 400 nm) spectral region ("BLACKLIGHT") and at 254 nm, an emission line in the mercury spectrum. The 254 nm line of mercury lies in the actinic ultraviolet (200 nm - 315 nm). Figure 1 shows a plot of the solar irradiance at sea level from 270 nm - 400 nm for comparison to the ultraviolet sources evaluated in this study.
  - b. Instrumentation. EG&G 585 Spectroradiometer with High Sensitivity Detector.
5. **FINDINGS.** Figures 2 - 6 show the spectral irradiance in the region 200 nm - 400 nm produced at a distance of 15 cm from the source and also include a short table showing permissible exposure durations.

Approved for public release; distribution unlimited



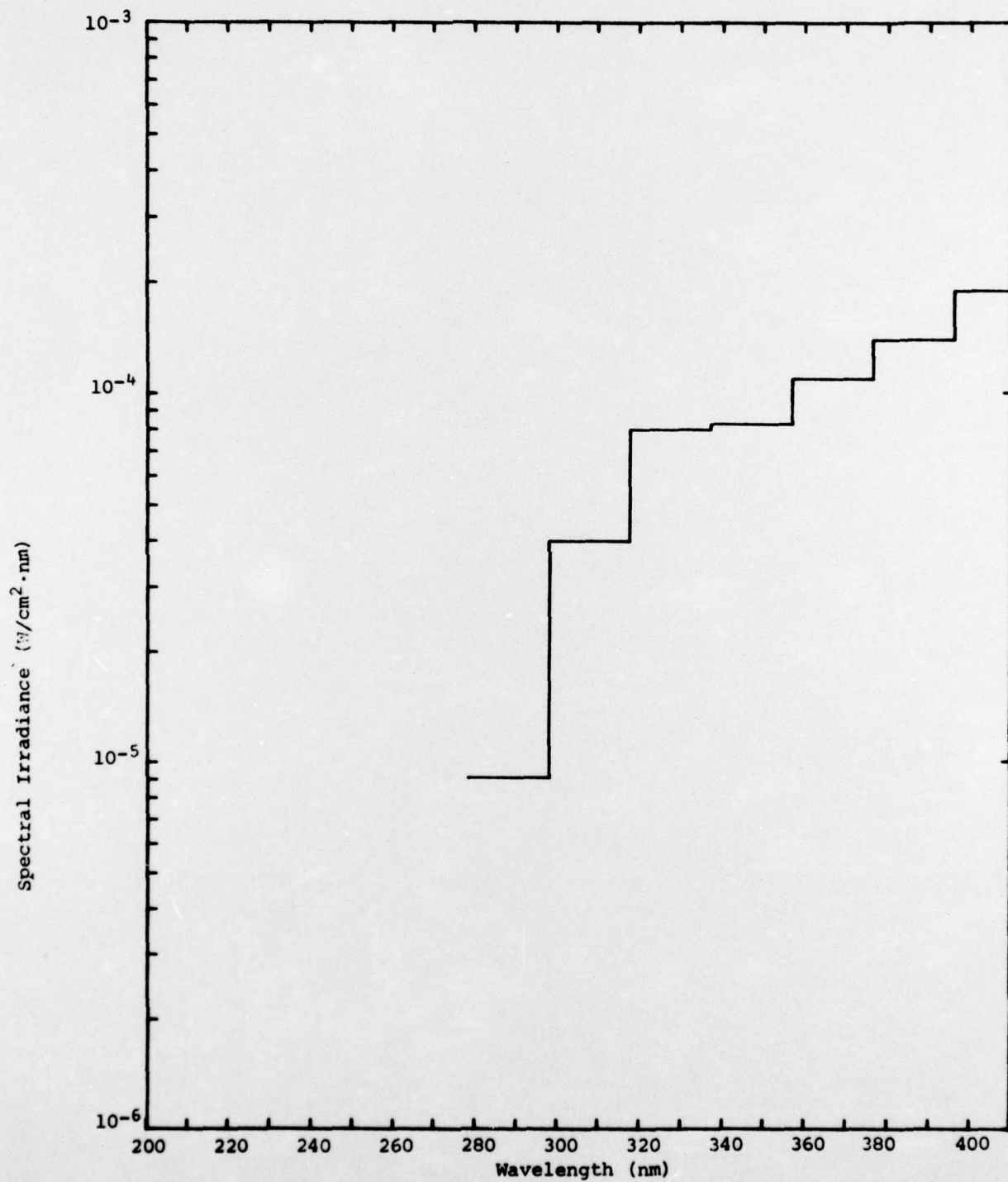


Figure 1. Absolute Solar Spectral Irradiance at Sea Level on a Clear Day

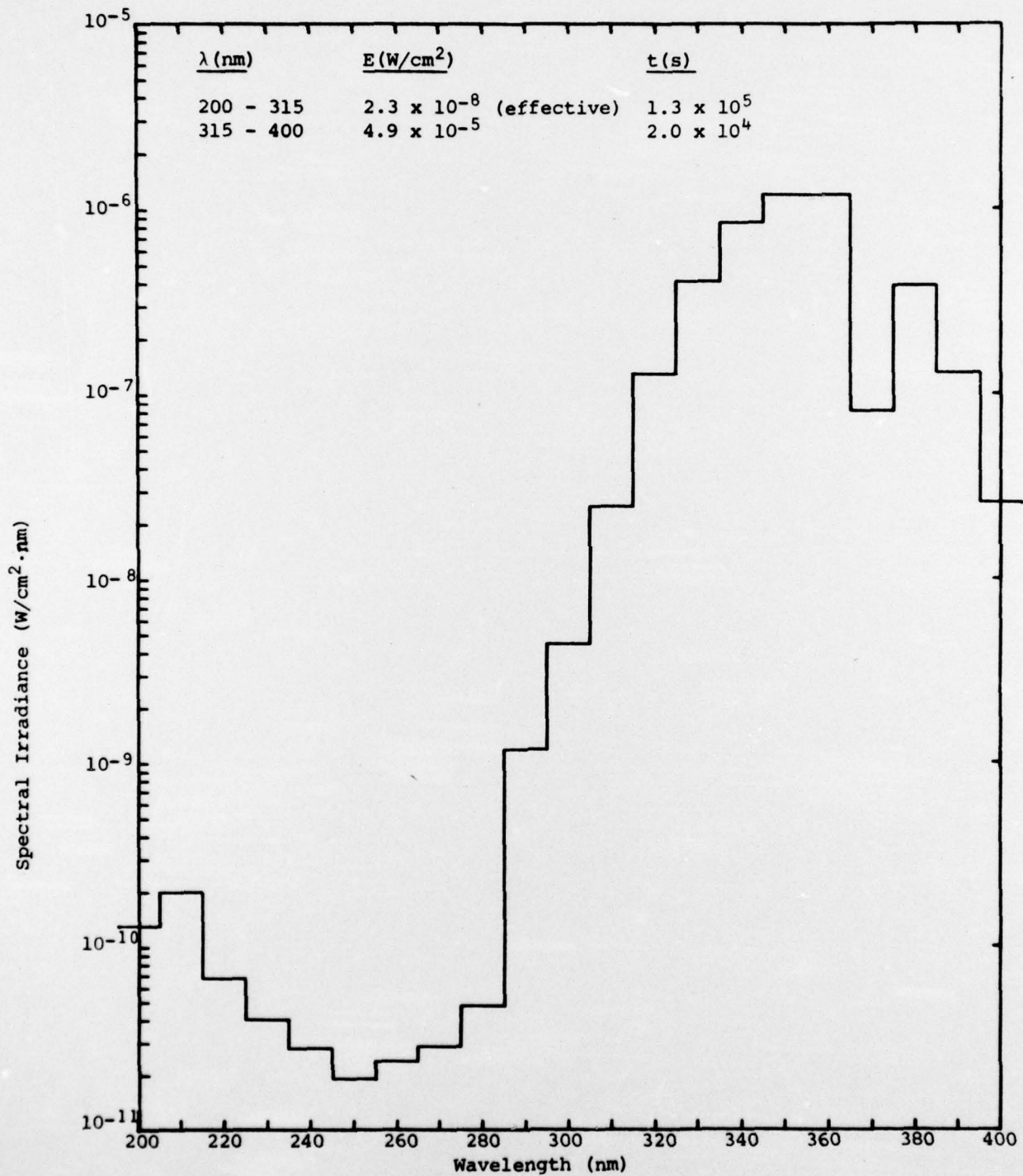


Figure 2. Absolute Spectral Irradiance of the Ultra-Violet Products, Inc., Mineral Light Longwave UVSL25

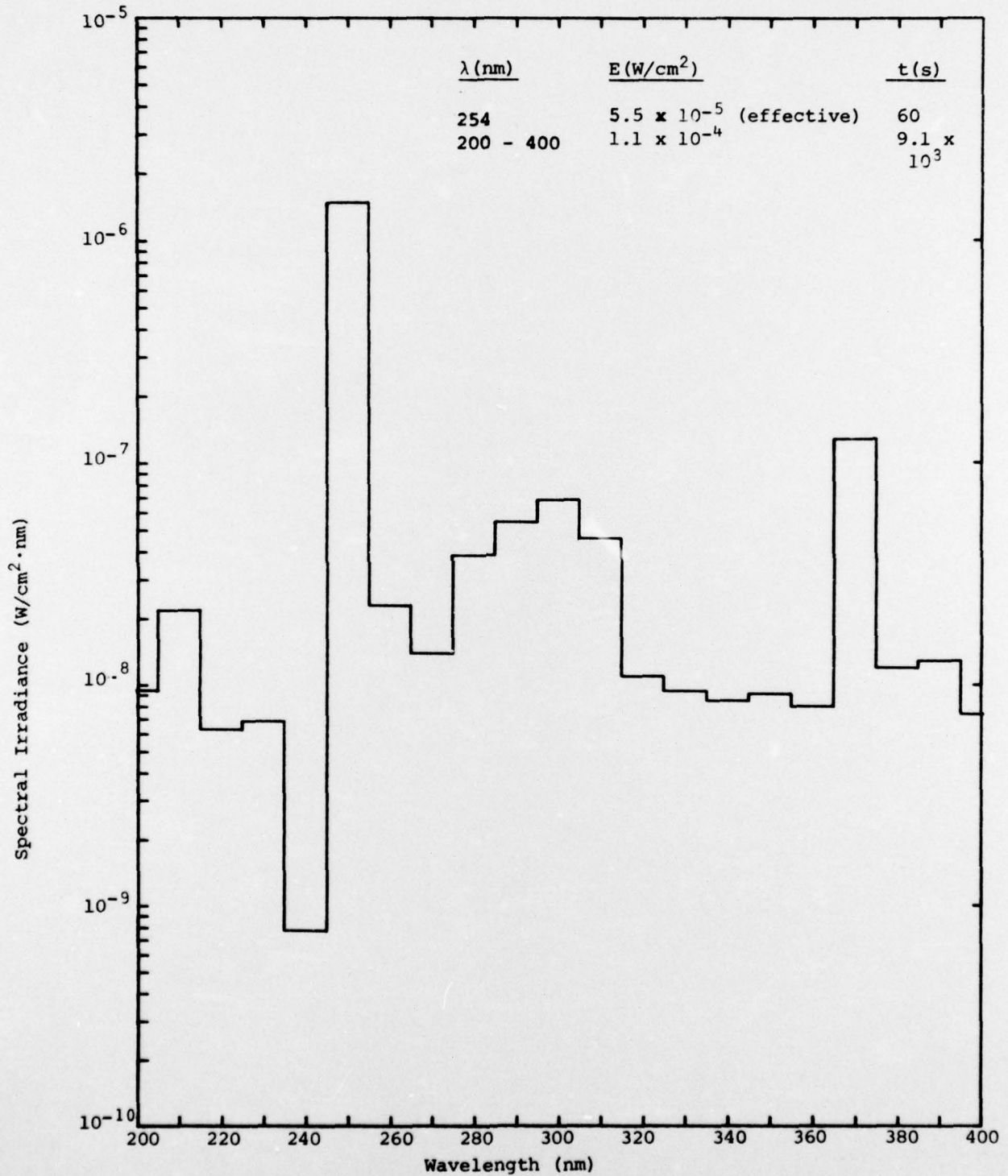


Figure 3. Absolute Spectral Irradiance of the Ultra-Violet Products, Inc., Mineral Light Shortwave UVSL25

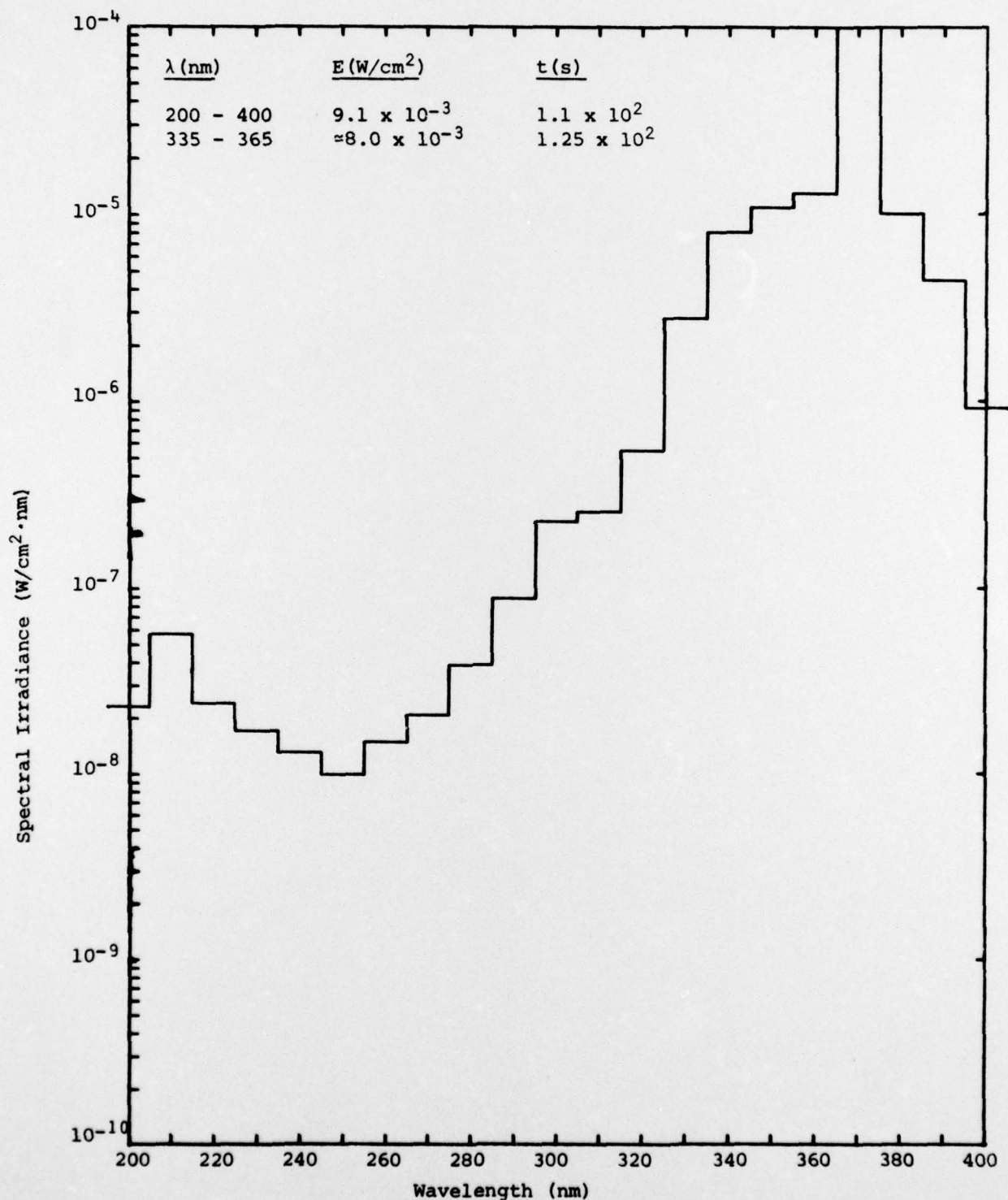


Figure 4. Absolute Spectral Irradiance of Blak-Ray Model B-100  
Made by Ultra-Violet Products, Inc., Lamp is H44GS-108

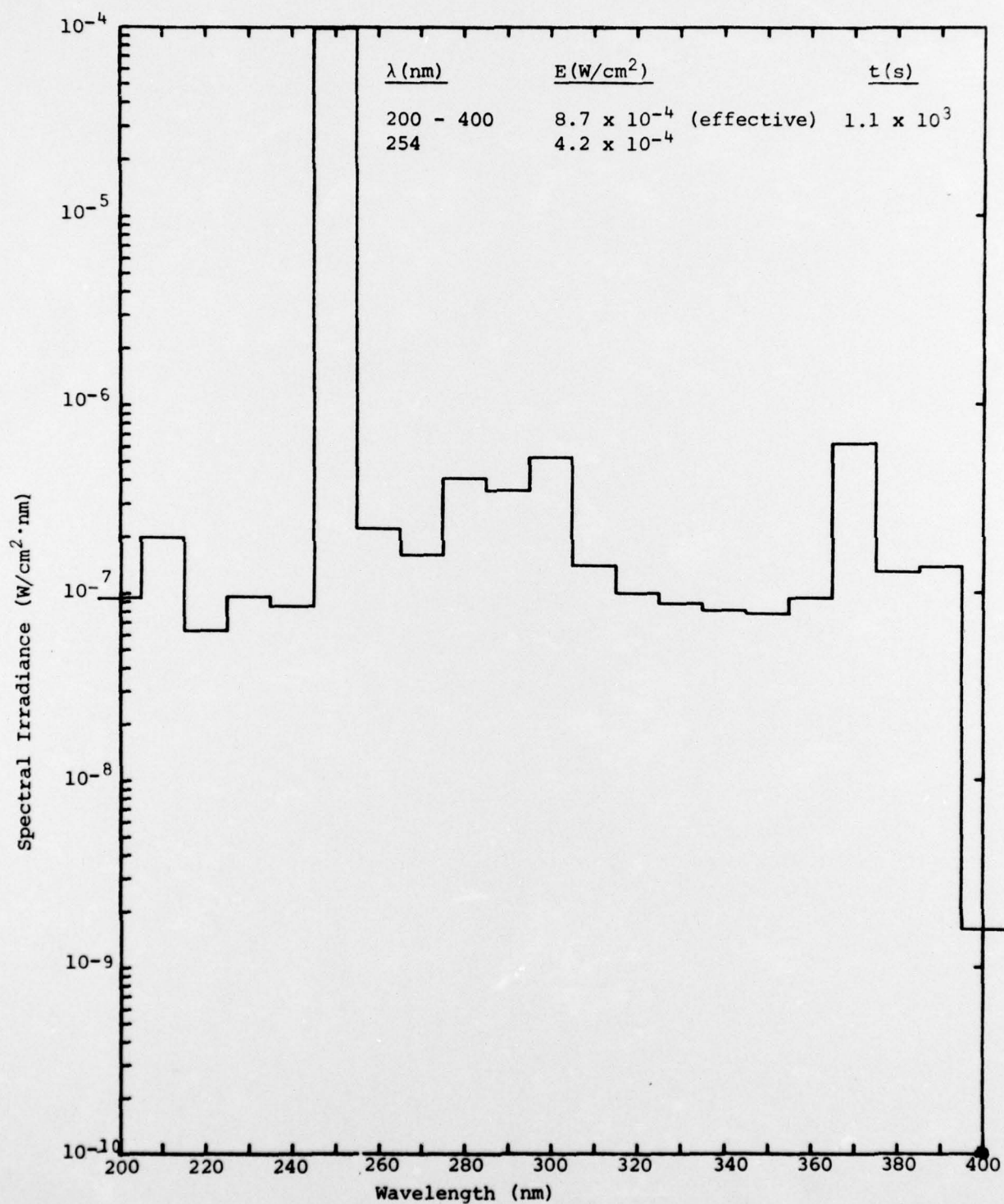


Figure 5. Absolute Spectral Irradiance of the Mineral Light Model R52. This Fixture is Manufactured by Ultra-Violet Products, Inc. Note: Spectrum Emitted by Longwave Side No Different from Shortwave.

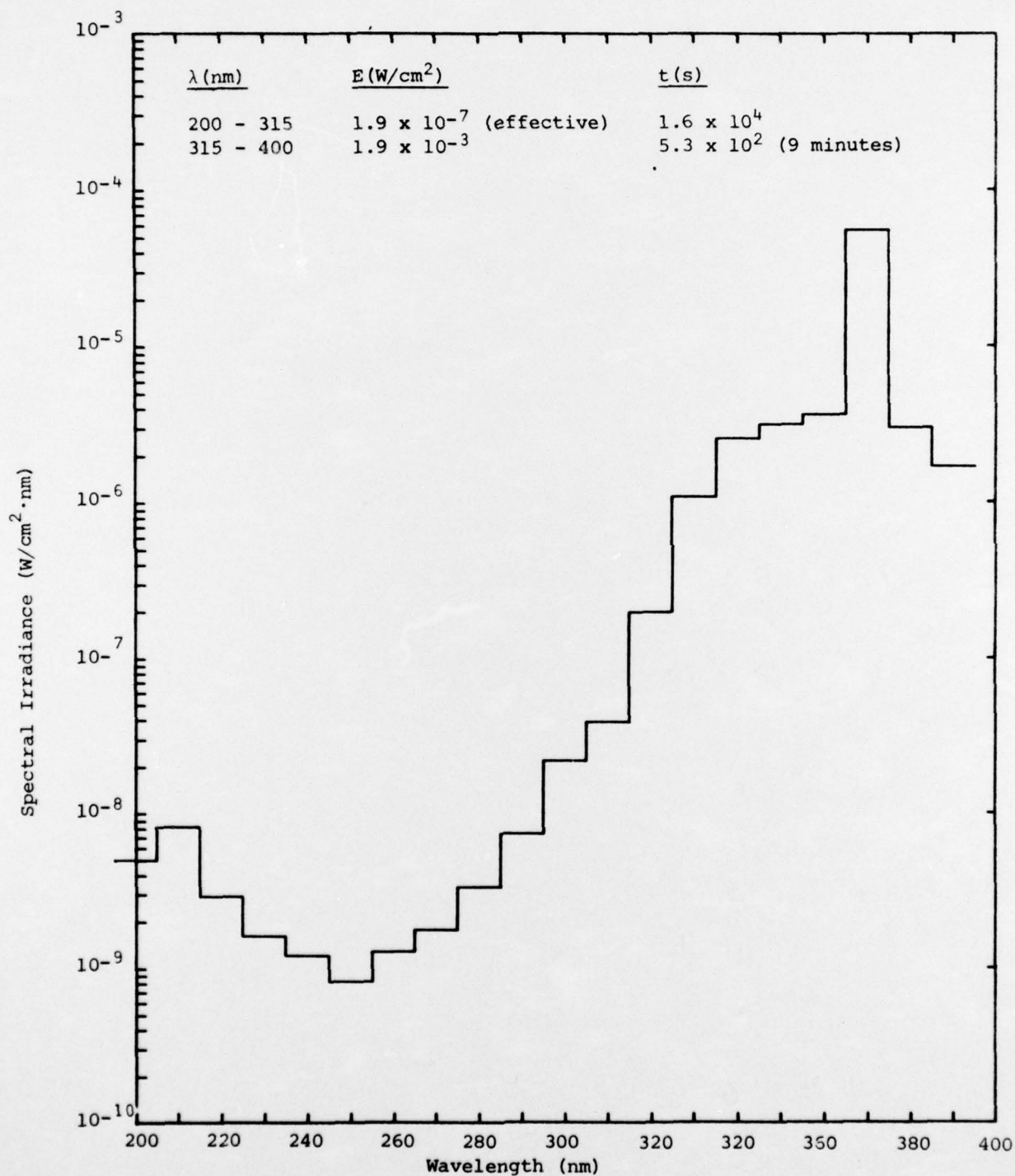


Figure 6. Absolute Spectral Irradiance of the B-100 Spectroline  
Manufactured by BLACKLIGHT Eastern Corp.

Nonionizing Radn Prot Sp Study No. 42-0305-77, Jul - Sep 76

6. CONCLUSION. The five sources evaluated emit potentially hazardous levels of optical radiation at a distance of 15 cm.

7. RECOMMENDATIONS.

a. Provide plastic laboratory goggles to workers who must operate the Mineral Light Model R52 and the shortwave part of the Mineral Light UVSL25. These goggles should be worn during operation of the two Mineral Lights [paragraph 1-5d(3), AR 40-46].

b. Place labels on the Mineral Light Model R52 and the Mineral Light Shortwave UVSL25 as follows: [paragraph 1-5d(1) of AR 40-46].



Nonionizing Radn Prot Sp Study No. 42-0305-77, Jul - Sep 76

c. Place warning labels on the B-100 Spectroline and B-100 Blak-Ray® as follows:



APPROVED:

*John T. Taylor*  
for ROBERT T. WANGEMANN, Ph.D.  
LTC, MSC  
Chief, Laser Microwave Division

*William G. Pearson*  
WILLIAM G. PEARSON  
COL, MSC  
Director, Radiation and  
Environmental Sciences

*James K. Franks*  
JAMES K. FRANKS  
Physicist  
Laser Microwave Division

*Darius J. Crews*  
DARIUS J. CREWS  
Electronics Technician  
Laser Microwave Division

⊥  
® Blak-Ray is a registered trademark of Ultra-Violet Products, Inc., San Gabriel, California. Use of trademarked name does not imply endorsement by the US Army, but is used only to assist in identification of a specific product.